

0547 Interaction of Small Crystal Form of Hydroxyapatite with Mutans Streptococci

T. ARAKAWA¹, T. ISHIZAKI¹, R.E. HAYMAN¹, N. HANADA², and H. SENPUKU³, 1 Sangi Co, Ltd, Saitama, Japan, 2 National Institute of Public Health, Tokyo, Japan, 3 National Institute of Infectious Diseases, Tokyo, Japan

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Objectives: Hydroxyapatite (HA) is a component of biological hard tissue, including tooth enamel. Small crystal HA (scfHA) shows stronger adsorption to all streptococci than moderate (mcfHA) and large (lcfHA) crystal forms. We examined the potential effectiveness of scfHA as an agent for removing mutans streptococci from the oral cavity in a Dental Drug Delivery System (3DS) employing a drug-retainer formed to fit on individual dentition. First, bacterial adsorption to mcfHA and lcfHA formed by heating at 800 and 1200 degrees-centigrade respectively, and to two types of scfHA formed at 0 and 200 degrees-centigrade respectively was investigated in human saliva. Second, a clinical trial of 3DS using scfHA paste was performed in 5 human subjects. **Method:** (1) Streptococcus mutans were mixed with HA or saliva-coated HA (s-HA) in PBS, with and without addition of divalent metal ions Ca²⁺ and Mg²⁺ respectively, and incubated for 90 min at 37 degrees-centigrade. After standing of the mixtures at room temperature, the optical density of the supernatant (O.D.550) was analyzed to assess bacterial adsorption levels. (2) 3DS using the paste was applied to subjects 5 minutes per day for 1 week. Oral bacteria numbers were determined quantitatively by culture from stimulated saliva collected before and after the week of application. **Results:** Bacterial adsorption to s-scfHA was reduced by Ca²⁺, in a dose-dependent manner, while Mg²⁺ showed no effect on adsorption. This suggests that Ca²⁺ in saliva may disturb the bacterial adsorption effect of scfHA paste in the oral cavity. In the clinical trial, saliva testing 5 weeks after 3DS treatment showed that mutans streptococci were removed from oral cavity by 3DS with scfHA paste. **Conclusion:** ScfHA paste is an effective agent for removing mutans streptococci from the oral cavity in 3DS, especially if a drug-retainer system that avoids the influence of saliva is used.